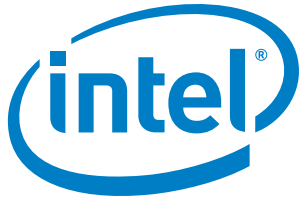

Intel® Trace Analyzer and Collector 8.0 for Windows* and Linux*

In-Depth

Contents

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Analyze, optimize, and deploy high-performance applications on Intel® processor-based clusters. Intel® Trace Analyzer and Collector 8.0 provides information critical to understanding and optimizing application performance on clusters by quickly finding performance bottlenecks in MPI communication. Version 8.0 includes trace file comparison, counter data displays, and an MPI Correctness Checking Library. It is enhanced with new features that accelerate the analysis and tuning cycle of MPI-based HPC cluster applications. New graphical features, as the Imbalance diagram, or the interconnect simulator help even advanced MPI programmers to identify further optimization opportunities.

Features

Why Intel Trace Analyzer and Collector 8.0?

Analyze MPI performance. Speed up parallel application runs. Locate hotspots and bottlenecks. Compare trace files with graphics providing extensively detailed analysis and aligned timelines.

- Supported on Linux and Microsoft Windows
- Intuitive full color customizable GUI with many drill-down view options
- Highly scalable with low overhead and efficient memory usage
- Easy runtime loading—or instrument an MPI application executable
- MPI Correctness Checking Library detects many types of errors in communication
- Track down communication hotspots with the Ideal Interconnect Simulator
- Integrated online help
- Easy installation and full documentation
- Full tracing and/or lightweight statistics gathering

What's New?

Identify optimization opportunities through:

- Application Imbalance diagram for simplified MPI based application analysis
- Ideal Interconnect Simulator (IIS) to understand application balance
- Intel® Custom Plug-in Framework (ICPF) to simulate application behavior over different interconnects

Many features, many options, major performance improvements.

- PIN-based binary instrumentation
- Runtime behavior displayed by function, process, thread, timelines, or cluster or node
- Multiple types of filtering (functions, processes, messages) and aggregation
- Performance counter data recording can be displayed as timeline
- Trace data is cached to reduce runtime overhead and memory consumption
- Traces multithreaded MPI applications for event-based tracing to non-MPI applications
- Fail safe tracing
- Support for MPI-1, SHMEM, MPI-IO, ROMIO
- Distributed memory checking with the MPI Correctness Checking Library

Trace Collector

- Automated MPI tracing and MPI Correctness Checking Library
- Generic distributed (non-MPI) and single process tracing
- Thread-level tracing with traces created even if the application crashes
- HPM data collection (PAPI, rusage, OS-counters)
- Configurable tracefile parameters
- Feature disabling/enabling
- Tuning parameters
- Distributed Memory checking with Valgrind*
- Binary runtime instrumentation
- Compiler instrumentation
  - Intel® C++ and Fortran Compilers: icc/ifort/icpc -tcollect
  - GNU* Compilers: gcc/g++ -finstrument-functions
- API: source code instrumentation (counter, function, message and collective operation logging)

Trace Analyzer

- Event, quantitative, qualitative, and counter timelines
- Flexible message and collective operation Profiles
- Function Profile (call graph, call tree, flat and load balance)
- Detailed comparison (of 2 traces)
- Multilevel source code visualization with a full text browser
- Flexible and powerful event tagging and filtering
- Hierarchical grouping and aggregation across function or processes data

- Large set of configuration parameters per chart
- Export profiling data as text; export charts to graphics or printer
- Command line interface

MPI Checking

Included in Intel Trace Analyzer and Collector is a unique MPI correctness checker to detect deadlocks, data corruption, or errors with MPI parameters, data types, buffers, communicators, point-to-point messages and collective operations. By providing checks at runtime, and reporting the errors as they are detected, the debugging process is greatly expedited. The correctness checker also allows debugger breakpoints to help in-place analysis but has a small enough footprint to allow use during production runs. The true benefit of the Intel Trace Analyzer and Collector Correctness Checker is the potential to scale to extremely large systems and the ability to detect errors even among a large number of processes. The checker can be set to view deadlocks regardless of fabric type.

By tracking data types and wrapping MPI calls, the requests and communicators can be reused from the trace collector. (The checking library is compiled from the source code of the performance data collection library.) The Analyzer is able to extremely rapidly unwind the call stack and use debug information to map instruction addresses to source code with and without frame pointers.

With both command line and GUI interfaces, the user can additionally set up batch runs or do interactive debugging. The timeline view shows actual function calls and process interactions which highlights excessive delays or errors that stem from improper execution ordering.

See screen shots of various displays including metrics tracking, timeline views and parallel displays at http://www.intel.com/cd/software/products/asmo-na/eng/374084.htm.

Instrumentation and Tracing

Intel Trace Analyzer and Collector specializes in low intrusion binary instrumentation. It can create and add this instrumentation to existing statically and dynamically linked binary executables to allow automatic monitoring of MPI as well as function entry and exit points. This includes the capability of tracing and recording performance data from parallel threads in C, C++ and Fortran.

Intel Trace Analyzer and Collector support both MPI applications and distributed non-MPI applications in C, C++, and Fortran. For applications running with Intel® MPI Library, this includes tracing of internal MPI states.

Technical Support

With the purchase of Intel® Software Development Products, you will receive one year of technical support and product updates from Intel® Premier Support at https://premier.intel.com/, our interactive issue management and communication website. This premium support service allows you to submit questions, download product updates, and access technical and application notes and other documentation. For more information, visit the Intel Registration Center at: http://www.intel.com/software/products/registrationcenter.

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